TABLE 370-1 TESTS USEFUL IN THE DIAGNOSIS OF ACUTE AND CHRONIC PANCREATITIS AND PANCREATIC TUMORS

Test	Principle	Comment
Pancreatic Enzymes in Body Fluids		
Serum lipase	Pancreatic inflammation leads to increased serum enzyme levels	Enzyme measurement of choice for diagnosis of acute pancreatitis
Amylase		
1. Serum	Pancreatic inflammation leads to increased serum enzyme levels	Simple; reliable if test results are three times the upper limit of normal
2. Urine	Renal clearance of amylase is increased in acute pancreatitis	Infrequently used
3. Ascitic fluid	Disruption of gland or main pancreatic duct leads to increased amylase concentration	Can help establish source of ascites; false positives occur with intestinal obstruction and perforated ulcer; can also measure lipase
4. Pleural fluid	Exudative pleural effusion with pancreatitis	False positives occur with carcinoma of the lung and esophageal perforation
Studies Pertaining to Pancreatic Structure		
Radiologic and radionuclide tests		
1. Plain film of the abdomen	Can be abnormal in acute and chronic pancreatitis	Infrequently used
2. Upper gastrointestinal x-rays		Infrequently used
3. Ultrasonography (US)	Can provide information on edema, inflammation, calcification, pseudocysts, and mass lesions	Simple, noninvasive; sequential studies quite feasible; useful in diagnosis of gallstones; pancreas visualization limited by interference from overlying bowel gas
4. Computed tomography (CT) scan	Permits detailed visualization of pancreas and surrounding structures, pancreatic fluid collection, pseudocyst; assessment of necrosis or interstitial disease	Useful in the diagnosis of pancreatic calcification, dilated pancreatic ducts, and pancreatic tumors; may not be able to distinguish between inflammatory and neoplastic mass lesions
5. Magnetic resonance cholangiopancreatography (MRCP)	Three-dimensional imaging has been used to produce very good images of the pancreatic-biliary ductal system by a noninvasive technique	Has replaced ERCP as a diagnostic test; noninvasive
6. Endoscopic ultrasonography (EUS)	High-frequency transducer used with EUS can produce very high-resolution images and depict changes in the pancreatic duct and parenchyma with great detail	Can be used to assess gallstones, chronic pancreatitis, and pancreatic carcinoma
7. Endoscopic retrograde cholangiopancreatography (ERCP)	Cannulation of pancreatic and common bile duct permits visualization of pancreatic-biliary ductal system	Primarily a therapeutic procedure; invasive
Pancreatic biopsy with US or CT guidance	Percutaneous aspiration biopsy of mass-forming lesions of the pancreas	High diagnostic yield; laparotomy avoided; can be done with EUS for the evaluation of chronic pancreatitis, autoimmune pancreatitis, and pancreatic carcinoma
Tests of Exocrine Pancreatic Function		
Direct stimulation of the pancreas with analysis of duodenal contents		
1. Secretin test	Secretin leads to increased output of pancreatic juice and HCO_3^-; pancreatic secretory response is related to the functional mass of pancreatic tissue	Sensitive enough to detect occult disease; involves duodenal intubation and fluoroscopic placement of gastroduodenal tube; poorly defined normal enzyme response; overlap in chronic pancreatitis; large secretory reserve capacity of the pancreas; currently done at only a few medical centers
2. Endoscopic secretin test	Replaces need for tube placement duodenum	Sensitive enough to detect occult disease; high negative predictive value; avoids intubation and fluoroscopy; requires sedation
Measurement of intraluminal digestion products		
1. Quantitative stool fat determination	Lack of lipolytic enzymes brings about impaired fat digestion	Reliable reference standard for defining severity of malabsorption; does not distinguish between maldigestion and malabsorption
Measurement of pancreatic enzymes in feces		
1. Elastase	Pancreatic secretion of proteolytic enzymes; not degraded in intestine	Diagnostic accuracy best if value is <100 μg/g performed on a solid stool

inconclusive results. In this regard, tests using *direct* stimulation of the pancreas with secretin are the most sensitive.

Pancreatic Enzymes in Body Fluids The serum amylase and lipase levels are widely used as screening tests for acute pancreatitis in the patient with acute abdominal pain or back pain. Values greater than three times the upper limit of normal in combination with epigastric pain strongly suggest the diagnosis if gut perforation or infarction is excluded. In acute pancreatitis, the serum amylase and lipase are usually elevated within 24 h of onset and remain so for 3–7 days. Levels usually return to normal within 7 days unless there is pancreatic ductal disruption, ductal obstruction, or pseudocyst formation. Approximately 85% of patients with acute pancreatitis have a threefold or greater elevated serum lipase and amylase levels. The values may be normal if (1) there is a delay (of 2–5 days) before blood samples are obtained, (2) the underlying disorder is chronic pancreatitis rather than acute pancreatitis, or (3) hypertriglyceridemia is present. Patients with hypertriglyceridemia and proven pancreatitis have been found to have spuriously low levels of amylase and perhaps lipase activity. In the absence of objective evidence of pancreatitis by abdominal ultrasound, CT scan, MRCP, or EUS, mild to moderate elevations of amylase and/or lipase are not helpful in making a diagnosis of chronic pancreatitis.

The serum amylase can be elevated in other conditions (Table 370-2), in part because the enzyme is found in many organs. In addition to the pancreas and salivary glands, small quantities of amylase are found in the tissues of the fallopian tubes, lung, thyroid, and tonsils and can be produced by various tumors (carcinomas of the lung, esophagus, breast, and ovary). Isoamylase determinations do not accurately